

IN THE CLAIMS:

Please AMEND claims 27, 36 and 47-50, as follows. For the Examiner's convenience, all claims currently pending in this application have been reproduced below:

1-26. (Previously Canceled)

27. (Currently Amended) An apparatus for determining a position of a mark on an object placed on a stage, said apparatus comprising:

an image sensing system which ~~obtains image data by sensing an image of the mark~~ has an image sensor and obtains image data of the mark by accumulating image signals corresponding to an image of the mark within the image sensor during an accumulation period;

a measurement system which measures a position of the stage plural times during ~~the sensing of the image of the mark by~~ the accumulation period of said image sensing system; and

an arithmetic section which calculates the position of the mark based on the image data obtained by said image sensing system and the positions of the stage measured by said measurement system.

28. (Previously Presented) The apparatus according to claim 27, wherein said image sensing system stores an image signal of the mark during an observation period and obtains the

image data used for determining an average position of the mark during the observation period based on the stored image signal.

29. (Previously Presented) The apparatus according to claim 27, wherein said image sensing system and said measurement system obtain the image data of the mark and the positions of the stage, respectively, during substantially the same observation period.

30. (Previously Presented) The apparatus according to claim 27, wherein after the stage moves to a position where said image sensing system can sense the image of the mark and before the stage stops, said image sensing system and said measurement system start sensing the image of the mark and measuring the positions of the stage, respectively.

31. (Previously Presented) The apparatus according to claim 27, wherein said image sensing system comprises an off-axis scope.

32. (Previously Presented) The apparatus according to claim 27, wherein said measurement system comprises an interferometer.

33. (Previously Presented) The apparatus according to claim 27, wherein
the object has a plurality of areas, and the mark is formed in correspondence with
each of the plurality of areas, and

a position of each of the plurality of areas is calculated based on the positions of the marks obtained for a subset of the plurality of areas.

34. (Previously Presented) The apparatus according to claim 33, wherein said arithmetic section calculates a positional deviation of the mark with respect to each of the subsets based on the image data obtained by said image sensing system and the positions of the stage measured by said measurement system, and calculates the position of each of the plurality of areas based on the positional deviations.

35. (Previously Presented) The apparatus according to claim 30, wherein said apparatus is arranged such that the stage is moved at a substantially constant speed in the position where said image sensing system can sense the image of the mark.

36. (Currently Amended) An exposure apparatus comprising:

- a stage on which a substrate is placed;
- a lens section which projects a pattern onto the substrate;
- a first measurement system which has an image sensor and measures a position of a mark formed on the substrate based on image data of the mark that is obtained by accumulating image signals corresponding to an image of the mark within said image sensor during an accumulation period;

a second measurement system which measures a position of the stage plural times during the ~~measurement of the position of the mark by~~ accumulation period of said measurement system; and

a calculation section which calculates the position of the mark based on a measurement result by said first measurement system and measurement results by said second measurement system; and

a positioning system which drives the stage based on the position of the mark calculated by said calculation section.

37. (Previously Presented) The apparatus according to claim 36, wherein said first measurement system includes an image sensing system arranged to sense an image of the mark, said image sensing system storing an image signal of the mark during an observation period and obtaining an average position of the mark during the observation period based on the stored image signal.

38. (Previously Presented) The apparatus according to claim 36, wherein said first measurement system and said second measurement system measure the position of the mark and the positions of the stage, respectively, during substantially the same observation period.

39. (Previously Presented) The apparatus according to claim 36, wherein after said stage moves to a position where said first measurement system can measure the position of the mark

and before said stage stops, said first measurement system and said second measurement system start measuring the position of the mark and the positions of the stage, respectively.

40. (Previously Presented) The apparatus according to claim 36, wherein said first measurement system comprises an off-axis scope.

41. (Previously Presented) The apparatus according to claim 36, wherein said second measurement system comprises an interferometer.

42. (Previously Presented) The apparatus according to claim 36, wherein
the substrate has a plurality of areas to be exposed, and the mark is formed in
correspondence with each of the plurality of areas, and
a position of each of the plurality of areas is calculated based on the positions of
the marks obtained for a subset of the plurality of areas.

43. (Previously Presented) The apparatus according to claim 42, wherein said calculation
section calculates a positional deviation of the mark with respect to each of the subsets based on
the position of the mark measured by said first measurement system and the positions of the stage
measured by said second measurement system, and calculates the position of the stage with
respect to each of the plurality of areas based on the positional deviations.

44. (Previously Presented) The apparatus according to claim 39, wherein said apparatus is arranged such that said stage is moved at a substantially constant speed in the position where said first measurement system can measure the position of the mark.

45. (Previously Presented) The apparatus according to claim 36, further comprising a determination system which determines a mode to be applied when said calculation section calculates the positions of the mark.

46. (Previously Presented) The apparatus according to claim 45, wherein said determination system determines the mode based on the position of the mark and the positions of the stage, which are measured by said first measurement system and said second measurement system, respectively, while placing, on said stage, the substrate having the mark which is formed by exposing a pattern by said exposure apparatus.

47. (Currently Amended) A method for determining a position of a mark on an object placed on a stage, said method comprising steps of:

first measuring of a position of a mark formed on the object based on image data of the mark that is obtained by accumulating image signals corresponding to an image of the mark within an image sensor during an accumulation period;

second measuring of a position of the stage plural times during the ~~measurement of the position of the mark~~ accumulation period in said first measuring step; and

calculating the position of the mark based on a measurement result in said first measuring step and measurement results in said second measuring step.

48. (Currently Amended) A method adapted for an exposure apparatus having a stage on which a substrate is placed, and a lens section which projects a pattern onto the substrate, said method comprising steps of:

first measuring of a position of a mark formed on the substrate based on image data of the mark that is obtained by accumulating image signals corresponding to an image of the mark within an image sensor during an accumulation period;

second measuring of a position of the stage plural times during the ~~measurement of the position of the mark~~ accumulation period in said first measuring step; and

calculating the position of the mark based on a measurement result in said first measuring step and measurement results in said second measuring step; and

driving the stage based on the position of the mark calculated in said calculating step.

49. (Currently Amended) A method of manufacturing a device, using an exposure apparatus having a stage on which a substrate is placed, and a lens section which projects a pattern onto the substrate, said method comprising steps of:

placing the substrate applied with a resist on the stage;

first measuring of a position of a mark formed on the substrate based on image data of the mark that is obtained by accumulating image signals corresponding to an image of the mark within an image sensor during an accumulation period;

second measuring of a position of the stage plural times during the ~~measurement of the position of the mark~~ accumulation period in said first measuring step; ~~and~~

calculating the position of the mark based on a measurement result in said first measuring step and measurement results in said second measuring step;

aligning the substrate using the stage in the exposure apparatus based on the position of the mark calculated in said calculating step; and

transferring a pattern to the substrate using the lens section.

50. (Currently Amended) An apparatus for determining a position of a mark on an object placed on a stage, said apparatus comprising:

a first measurement system which has an image sensor and measures the position of the mark based on image data of the mark that is obtained by accumulating image signals corresponding to an image of the mark within an image sensor during an accumulation period;

a second measurement system which measures a position of the stage plural times during the ~~measurement of the position of the mark by~~ accumulation period of said first measurement system; and

a calculation section which calculates the position of the mark based on a measurement result by said first measurement system and measurement results by said second measurement system.